

Remarks

Claims 1-11 are currently pending in the patent application. For the reasons and arguments set forth below, Applicant respectfully submits that the claimed invention is allowable over the cited reference.

The instant Office Action dated December 17, 2007, notes an objection to the drawings and the following rejections: claim 11 stands rejected under 35 U.S.C. § 112(2); claims 1-7 and 9-11 stand rejected under 35 U.S.C. § 102(b) over Ovshinsky *et al.* (US Patent No. 5,912,839); and claim 8 stands rejected under 35 U.S.C. § 113(a) over Ovshinsky.

Applicant submits that the amendment to claim 11 overcomes the Section 112(2) rejection.

Applicant submits that the objection to the drawings is without basis as the indicated items are clearly shown in FIG. 7. Specifically, as described at paragraph 0071 in the specification, “[t]he contact areas 132A and 132B are smaller than or equal to the second contact areas 272A and 272B, respectively.”

Applicant respectfully traverses the Section 102(b) rejections because the cited ‘839 reference does not provide correspondence to all of the claimed limitations including those directed to a fast growth phase change material, and makes use of materials and approaches that are wholly different in nature and operation, relative to the claimed invention. For example, the purpose of the ‘839 reference is directed to changing a memory element between resistance states using a material that is amenable to a stepped phase change approach (*see, e.g.*, the Abstract). Generally, the memory element in the ‘839 reference includes a material that crystallizes (*i.e.*, nucleates for crystal growth) to some degree with each of several pulses, and changes resistance states in response to a sufficient number of pulses, effectively accumulating crystallization with each pulse (*see, e.g.*, column 12:29-41). Example durations of these pulses and the related phase/resistance change occur over a time period that is often an order of magnitude greater than that generally exhibited by the claimed fast growth materials. For example, the ‘839 reference describes one such example at column 21:12, where the memory element is changed in state over a series of eight pulses of 40 nanoseconds each, for a total time of at least 320 nanoseconds, plus any time between pulses.

In consideration of the above, the '839 reference does not provide correspondence to a phase change material and arrangement that implements a fast growth material as claimed. Such a material generally exhibits a crystal growth mechanism involving crystallization that starts at an interface between amorphous and crystalline phases of the material, and rapidly progresses across the material. This phase change occurs over a time period relative to the size of the amorphous phase, with example crystallization speeds of at least about 1m/s, as corresponding to phase change durations that can be less than about 10 ns (nanoseconds). This approach is in contrast, for example, to slower nucleation approaches involving the initiation of crystallization at random places in a particular material (*see, e.g.*, discussion at paragraph 0011).

In view of the above, Applicant submits that the '839 reference fails to disclose the claimed fast-growth material as recited in claim 1 (and applicable to claims 2-11 that depend therefrom), relative to the crystallization approach and/or the speed at which the crystallization occurs. In this regard, the step-based memory element in the '839 reference does not provide correspondence to the claimed invention. Applicant therefore submits that the Section 102(b) rejection is improper and should be removed.

Notwithstanding the above, Applicant has amended claim 1 to include limitations relating to the indicated fast growth material, in that crystallization initiates at an interface between crystalline and amorphous materials. This is consistent with the specification and its characterization of fast growth materials. Applicant has reviewed the '839 reference and submits that it fails to disclose these limitations as well. Therefore, the Section 102(b) rejection should also be removed in view of these limitations.

Applicant further traverses the Section 102(b) rejection over dependent claims 2-7 and 9-11 because the Office Action has not provided correspondence to multiple claim limitations. For instance, regarding claim 2, the Office Action has not attempted to show any correspondence to the claimed growth rate. Similarly, the Office Action has not attempted to show correspondence to various claimed compositions and materials (*e.g.*, as in claim 3 and others). For example, while the Office Action cites to certain example ranges for a Te-Ge-Sb alloy in the '839 reference, the cited discussion fails to disclose the claimed ranges with specificity and therefore is insufficient to anticipate these claimed limitations (*see, e.g.*, M.P.E.P. §2131.03). Other limitations are ignored as a whole.

New claim 17 should be allowable over the cited reference based upon the above discussion and its dependency upon claim 1. Applicant further submits that the cited reference fails to disclose limitations directed to a fast growth material exhibiting a crystallization approach that is substantially devoid of nucleation.

New claims 18-22 should also be allowable over the cited reference based upon the above discussion relative to limitations similar to those in claim 1, and further because the cited reference does not disclose the claimed crystallization layer and the fast-growth crystallization at an interface thereof.

Applicant traverses the Section 103(a) rejection of claim 8 over the sole '839 reference because the '839 reference fails to provide teaching or suggestion as discussed above in connection with the Section 102(b) rejection of claim (from which claim 8 depends). Applicant further traverses the Section 103(a) rejection because the Office Action provides neither teaching or suggestion of all the claim limitations nor evidence of motivation for modifying the '839 reference as asserted. Rather than cite any prior art, the Office Action concludes that "one of ordinary skill in the art would optimize [concentrations and effective variables] to store data" and that such an optimization "involves only routine skill in the art." These statements are unsupported by any reference and contrary to the requirements for establishing a *prima facie* Section 103 rejection. Moreover, as described at length in the instant application, the claimed limitations relate to example embodiments that are tailored to applications to achieve high-speed switching. The Office Action provides no rationale, from the prior art or otherwise, in support of the notion that one of skill in the art would somehow have optimized the claimed invention using routine skill where there is no suggestion to do so.

In view of the above, Applicant believes that each of the rejections has been overcome and the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Peter Zawilski, of NXP Corporation at (408) 474-9063.

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